Conditions for a Single Mobile Telecommunications Services Market

Under reasonable conditions, all mobile telecommunications licensees — including those providing cellular, PCS, and Specialized Mobile Radio services — should be considered to be in the same antitrust market. Moreover, under these conditions, the capacity of each firm to transmit information over its bandwidth, without regard to the uses to which that bandwidth is put, is the correct measure of firm shares, and market concentration can be measured using these shares.[14] This section discusses the conditions under which market definition and concentration measurement can be carried out in this manner. It also considers how market definition and concentration change if the conditions described here are not met.

To anticipate our conclusion, we find that it is reasonable to treat all firms that provide mobile telecommunications services as being in the same antitrust market. The key to this conclusion is that providers are legally able rapidly to move among the provision of various services, and can do so at modest cost. If all firms can easily offer a wide range of services, they are in the same market. The remainder of this section discusses the conditions supporting this conclusion.

Absence of Legal or Regulatory Restrictions on Spectrum Use. The first condition is that there are no legal or regulatory restrictions on the uses to which the spectrum licensed to any firm can be put. If there are no restrictions on spectrum use, and the other conditions discussed below are also met, a licensee can shift from the provision of one service to another in response

[14] As discussed in detail below, there is not a one-to-one relationship between bandwidth and capacity. The capacity to transmit information is a function of both bandwidth and the technology used; analog technologies are inherently less capable than digital technologies. Capacity is based on effective bandwidth.

to an increase in prices. The absence of legal restriction is, therefore, necessary for all mobile service operators to be included in the same market.

Suppose, to the contrary, that FCC rules restricted the use of a particular portion of the spectrum to a specific mobile service, say, paging. In these circumstances, providers of paging services using that portion of the spectrum could not constrain price increases by, for example, mobile telephone carriers, because these providers of paging could not provide telephone service in response to a rise in its price.

It should be noted, however, that even if legal restrictions prevented some suppliers of paging service from shifting to providing telephone service, it may still be appropriate to include other (unconstrained) suppliers in the broader market for mobile telecommunications services. That is, if some providers of paging services are not constrained by regulation in the use to which they put their spectrum assignments, these suppliers could shift to providing telephone service if suppliers of telephone service were to attempt to raise their prices. Moreover, in the example, all mobile telephone service licensees are in the paging services market if they are not legally prevented from providing such services. If legal restrictions work in only one direction — that is, if mobile telephone service providers can provide paging services but not vice versa — there is no antitrust market for paging services that is distinct from other mobile services.

In fact, the Commission has defined PCS so broadly that the type of legal encumbrances considered here will not be present.[15] Unlike past instances in which FCC regulations have

[15] Second Report and Order, ¶¶ 19-24.

prevented the shift of spectrum from one use to another in response to opportunities for greater profit,[16] the provision of mobile services is today largely free of such restrictions.[17]

Bandwidth Fungibility. The second condition for the inclusion of all mobile telecommunications service providers in the same market is that all portions of the electromagnetic spectrum that have been allocated to the provision of mobile telecommunications services can be used to provide all of the same services and at about the same cost. If this condition is satisfied, an attempt on the part of any operator, or small group of operators, to raise the price of a particular mobile service would induce other providers to shift a portion of their capacity to the provision of that service, and to do so rapidly and at low cost. The effect would be to constrain the attempted price increase.

To the extent that particular portions of the spectrum are especially well-suited to the provision of particular services, it would be appropriate to define mobile service markets more narrowly. Thus, for example, if high-speed data services could be provided in the band allocated to cellular but not in the 2 GHz band, PCS providers could not shift capacity to the provision of those services to counteract a price increase. In these circumstances, PCS providers would not be in the high-speed data market.[18]

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[16]A classic example is the inability to shift spectrum in the UHF band from the provision of television services to the delivery of mobile telecommunications services. Some spectrum was eventually shifted but only after a prolonged regulatory delay.

[17]This is a key change from past FCC practice. Indeed, the Commission has recently modified the licenses of cellular operators to permit them to offer PCS, and recent changes in the policies with respect to SMR permit these operators to compete for PCS customers. See, for example, Second Report and Order, ¶¶ 20 and 111.

[18]An intermediate case is one in which the cost of providing the service in the 2 GHz band is greater than that in the cellular band. Moreover, as in the previous discussion, a given market could include some firms not currently supplying a particular service even if other firms cannot easily shift the services they offer.

It appears that those technical differences that do exist among the portions of the spectrum allocated to mobile telecommunications services are not so significant as to prevent firms operating in each portion of the spectrum from offering a similar array of mobile services at similar cost.[19] As a result, in the analysis that follows we treat the spectrum allocated to SMR, cellular radio, and PCS as if they are essentially fungible.[20]

Provider Equipment Flexibility. The third condition is that the equipment used to provide one type of mobile service, say telephone service, can, in a relatively brief period of time, be shifted to the provision of any other service, say paging. If this condition is satisfied, an attempt on the part of the providers of a given service to raise prices will be limited by the ability of the providers of other services to shift a portion of their capacity to the provision of those services whose prices have risen.[21]

Whether this condition will be met is determined both by the type of equipment that is available and by the choices made by mobile service providers. That is, equipment manufacturers must provide equipment that can be used to provide more than one service, and

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[19]We are aware of no PCS that could, for example, be made available in the 2 GHz band and not in the cellular band, and vice versa.

[20]This does not mean that we assume that all portions of the spectrum assigned to mobile services are identical in their physical characteristics, but only that the economic differences among them are not great. For example, radio waves in the cellular band travel longer distances and penetrate buildings more easily than do those in the 2 GHz band. However, these advantages are offset somewhat by the design of cellular systems in the higher band, which will permit greater frequency reuse and less expensive receiving sets because cell sites will be located closer together.

[21]Note that, under the terms of the Second Report and Order (¶ 134), PCS competitors are required to build systems to serve specific portions of the population in service areas according to a fixed schedule. The issue in evaluating equipment flexibility is not, therefore, whether or not the equipment will be installed, but whether it will be capable of delivering a wide range of mobile services.

PCS providers must choose to employ such multi-service equipment.[22] Existing equipment is capable of providing some data services in addition to voice transmission, and equipment flexibility will be enhanced in the future by the introduction of Cellular Digital Packet Data (CDPD) modules.

The significance of this condition is that not only must the available spectrum be both highly fungible and unencumbered by regulation, it must also be capable of being transferred from one use to another relatively rapidly and at relatively low cost if the market is to be defined broadly to include all providers of mobile telecommunications services.[23]

Minimum Spectrum Requirements. The provision of mobile telecommunications services requires at least some minimum bandwidth, and the amount of bandwidth needed differs among services. For example, paging services require relatively little bandwidth, voice service more bandwidth, high-speed data transmission still more, and video transmissions demand even more bandwidth. As a result, the ability of a provider to shift from one service to another depends on whether it has sufficient bandwidth, or can acquire that bandwidth, to offer the new service.

If, for example, a paging service provider has sufficient bandwidth to shift to the provision of voice service, we would consider the paging operator in a broader market that

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[22] In the alternative, one could have single-use equipment where a portion of the equipment is, or must be, replaced each year. In such circumstances, the market is defined more broadly than a particular mobile service because the choice of new equipment will reflect then-prevailing market conditions.

[23] "Rapidly" does not mean "instantaneously" and "low cost" does not mean "no cost." In terms of the Merger Guidelines, flexibility must be sufficiently great to prevent a significant and non-transitory increase in price by the suppliers of other services. See Merger Guidelines, ¶ 1.32. To the extent shifting into the provision of a new service takes longer (say, more than one year), or expenditure of significant sunk costs, these factors are taken into account in evaluating new entry into a market. If expansion into a new service would occur rapidly, albeit with more delay than the rapid response needed to include the firms in the same market, such entry would act to mitigate antitrust concerns that might be based on high market shares and concentration alone. See Merger Guidelines, ¶ 3.

includes the providers of voice service.[24] Moreover, even if no single paging provider had sufficient bandwidth to offer voice service, if the bandwidth available to a number of different providers could be combined relatively quickly, the bandwidth of all paging providers would be included in the broader market.

This is, of course, what is occurring through the consolidation of Special Mobile Radio licenses. Recent transactions include NexTel's acquisition of radio dispatch units of Questar and Advanced MobileComm as well as an ownership interest in CenCall Communications,[25] the recent acquisition of a significant number of Motorola's mobile radio licenses by CenCall and Dial Page,[26] and the pending merger of Dial Page and Transit Communications. One report notes that

> ...the deals will propel NexTel, CenCall, and Dial Page to the top of the mobile radio market, and almost certainly hasten their creation of a coast-to-coast network enabling customers to carry wireless handsets anywhere they travel.[27]

Customer Equipment Flexibility. Even if mobile telecommunications service providers can shift easily among services, so that there is substantial supply-side flexibility, there may be a concern that some users who employ equipment suited only to a single band can become "captive" customers of their suppliers. That is, although other suppliers can switch capacity to

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[24]Conversely, of course, the voice service provider has sufficient bandwidth to offer paging service.

[25]G. Naik, "Nextel to Buy Dispatch Units of 2 Concerns," Wall Street Journal, October 19, 1993, A6.

[26]G. Naik and M.J. Ybarra, "Motorola to Sell 42% of Licenses in Mobile Radio," Wall Street Journal, October 25, 1993, A2.

[27]Id.

serve them, they may be unable to make use of that capacity because of the equipment they employ.[28] Whether this raises a serious concern depends on a number of factors.

First, customers may be able, at some additional cost, to purchase receivers that are capable of operating in both the cellular and PCS bands. We are informed that such equipment can be made available, albeit at higher cost. Customers with such equipment cannot be captives. Second, if consumers anticipate that they may at least be partially "locked in" after they make equipment purchases, they may insist on price guarantees or other consideration to reduce the likelihood that they will subsequently be exploited. For example, market competition could result in consumer equipment being supplied by service providers. Third, if the cost of purchasing a new handset is small relative to the annual cost of the service, consumers' "sunk costs" will be a relatively minor factor tying customers to particular operators. Moreover, suppliers using different technologies may compete by offering discounts, or payments to cover "switching costs." Finally, if price discrimination among customers is not permitted, even apparently captive customers can face competitive prices. This arises because providers who compete for new customers must offer the same favorable terms to continuing ones.[29]

Technical Change. Product market boundaries are likely to be affected by technological developments. For example, a provider of paging services that had previously not been considered in the broader mobile telecommunications services market because it lacked sufficient bandwidth to offer voice service would be included if the use of digital technology permitted it to do so. A combination of the shift to digital technologies, the use of compression techniques,

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[28]This issue arises in any market in which consumers employ equipment that is specialized for a particular set of vendors.

[29]The importance of this factor depends on the flow of new customers into the market.

and the use of smaller cells is breaking down barriers that had previously separated markets, so that we appear to be moving rapidly to a single market in which many firms can offer a wide array of mobile services using the spectrum currently assigned to them.

Demand-Side Substitutability. Although our analysis emphasizes the ability of mobile telecommunications service providers to provide different types of services -- what is generally called supply-side substitutability -- we do not wish to underplay the fact that, for some services, users can substitute one mobile service for another.[30] For example, paging, combined with a return telephone call using the wireline system, may be a substitute in some circumstances for a mobile telephone call. Moreover, for some types of advanced paging, in which brief messages are displayed, there may be no need for the return call. In these circumstances, paging and telephone providers may compete directly for the same customers providing somewhat imperfect substitutes at presumably different prices. If, for example, an increase in the price of cellular telephone service causes a substantial number of subscribers to substitute paging services, both sets of providers would be in the same antitrust market.

Summary - Product Market Definition

In summary, so long as the conditions outlined above hold, the appropriate product market for antitrust analysis of mobile telecommunications services is very broad, encompassing all such services. Under these conditions, there would be few, if any, narrow markets limited to the provision of individual mobile telecommunications services.

[30]Of course, there are also some substitution possibilities between mobile and wireline services.

Defining the Geographic Market for Mobile Telecommunications Service

Current FCC plans are to auction off licenses to use portions of the PCS spectrum for varying geographic regions. Of the 120 MHz of bandwidth for which licenses will be auctioned, Channels A and B (30 MHz each) will be made available for broad geographic regions identified by Major Trading Areas (MTAs); the remaining 60 MHz (one license for the use of 20 MHz and four licenses for the use of 10 MHz each) will be auctioned off for far more narrow Basic Trading Area (BTA) regions.[31] Thus, the operating regions for firms competing in any given area will differ, and there is no way to know *a priori* precisely how those territories will overlap. Moreover, it would be serendipitous indeed to find that the operating regions of incumbent cellular operators were coincident with either a BTA or a MTA.

The Merger Guidelines direct attention to the narrowest geographic region within which price might be increased. Thus, in light of the FCC's intention to auction PCS rights within relatively narrow BTAs, these areas are the logical starting point for evaluating the relevant geographic market. The analysis begins by inquiring whether or not a price increase attempted by all sellers in a given BTA would be profitable.

The answer to this question depends heavily on whether firms in the BTA may charge different prices to customers in that narrow region from those charged to customers in other geographic regions where these firms also offer mobile telecommunications services. If mobile service suppliers could discriminate between customers in the BTA and those in other locations, the geographic market would be coincident with the BTA since, if the firms in the BTA raised prices, no competitor from outside the region could begin selling to customers in the area, and

[31] Second Report and Order, ¶¶ 56 and 76. There are 51 MTAs and 492 BTAs. On average, there are 9.6 BTAs per MTA.

customers in the BTA would be limited in their ability to subscribe to mobile service providers outside the BTA by the higher, roaming charges they would pay for local calls.[32] If mobile systems providers were allowed to, and chose to, discriminate in setting prices in narrow geographic regions, like BTAs, then those narrow regions would generally constitute relevant geographic markets. If, however, the firms could not discriminate, and therefore had to charge the same price to all customers in some broader region (the entire MTA, for example), then in many, if not most, instances, the relevant geographic market would be broader than the BTA.

For example, assume that each provider in the Greensboro-Spartanburg BTA (G-S) raised the price of mobile telecommunications services. The profitability of the hypothetical price increase depends crucially on what prices the firms in G-S charge to customers outside the area. At least two of the firms operating in that BTA (those firms that were awarded Channels A and B — 30 MHz each) also will provide mobile services in the other 22 BTAs in the Charlotte-Greensboro-Greenville (C-G-G) MTA. If the firms in the G-S BTA also raised prices to customers in all of those other BTAs, any added profits they would earn after raising prices in G-S would be offset, and likely overwhelmed by, the losses they suffered through foregone sales and profits to rivals in the other BTAs, which are assumed to hold their prices at the initial, lower levels.[33] Since the G-S BTA has only about 8 percent of the total population of the C-G-

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[32]Some customers on the fringe of two regions may be able to select between suppliers in more than one BTA. The economic significance of this option for market definition depends on the proportion of the population residing in these fringe areas. The larger the portion of consumers in fringe areas, the more likely it is that the market will be broader than an individual BTA. We assume here (allowing for price discrimination) that the consumers in such regions would not be so numerous as to result in markets broader than the BTA.

[33]In defining geographic markets, one assumes that the price is raised in the provisional market but that prices in the surrounding areas remain the same. Thus, if the price of mobile services in the G-S BTA is raised, the prices of other suppliers in other BTAs, Charlotte, for example, are assumed to remain constant. Since some firms in G-S must also raise prices in Charlotte (because of the ban on price discrimination), they will lose business to competitors in Charlotte that do not raise prices. It is, of course, possible that exactly the same group of firms will

G MTA, the lost revenues and profits suffered by those firms in the rest of the MTA would likely greatly outweigh the possible profit increase in G-S.

Current cellular operators in some BTAs would be similarly affected. Because cellular company service territories are not necessarily coincident with BTAs, those cellular operators that raised the price in a specific BTA, in addition to having to raise the price in other areas (while rivals in the other areas held prices constant), would lose sales and profits in the same manner as described above.

Of the 170 MHz of bandwidth (not including SMR) allocated to mobile telecommunications services, firms controlling at least 110 MHz will either operate throughout a MTA (firms with Channels A and B — 60 MHz) or may operate in some region different from a BTA (cellular operators — 50 MHz). Moreover, some of the remaining mobile service providers operating in Channels C through G, which are allocated by the BTA, may also operate in some other BTA within each MTA, and thus may also be subject to loss of business and profits if they raise prices. Thus, the share of the capacity of firms in each BTA that is affected by this potential loss of business is quite large. We conclude that, if firms were barred from discriminating in price across a MTA, many BTAs would not be relevant geographic markets; the appropriate market would encompass a larger region.[34]

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compete in each of the BTAs in the C-G-G MTA. If that were true, then in evaluating any individual BTA, mobile service prices would increase not only in the BTA, but also throughout the MTA. This means that the firms in the BTA would not lose business to competitors that held prices at the initial lower levels in other regions. In these circumstances, since the price has risen throughout the MTA, the MTA would be the relevant geographic market. Our analysis assumes that the rival sellers in surrounding BTAs (that do not raise prices) have the capacity to serve customers in those regions that would switch if prices of some mobile service suppliers were to rise.

[34]It is possible, of course, that an individual BTA could be a relevant geographic market. There may be situations where the population in one BTA is so large that the firms in that BTA would find a price increase profitable. Because such a large portion of the population would be affected by the hypothetical price increase, losses in other areas would not offset those gains. For example, the Houston BTA has about 78 percent of the

If a BTA that is initially proposed is rejected as a relevant geographic market, the next step is to expand the region considered to include other BTAs and repeat the analysis. For example, one would next add an area adjacent to G-S, and repeat the test. One might, for example, evaluate the G-S and the adjacent Columbia, SC BTAs together. This combined region, however, has only about 14 percent of the population in the MTA. Raising prices in the G-S and Columbia BTAs would force the firms that compete across the entire MTA to operate at a competitive disadvantage, and lose profits, in all other BTAs in the C-G-G MTA, including, among others, Charlotte (17 percent of the population), Greensboro-Winston Salem-High Point (13 percent), and Raleigh-Durham (11 percent). It is highly unlikely that a firm that has an obligation to operate a system, and incur expenses, in the entire MTA would find such a price increase profitable. Cellular firms that operated in overlapping areas would be similarly affected. Even this expanded region, encompassing two BTAs, is unlikely to be a relevant geographic market.

At some point, as the proportion of population in the proposed market increases relative to the population of the MTA — as the number of BTAs is increased — a hypothetical price increase likely would become profitable.[35] As the portion of business in the candidate area increases, the added profit from the price increase outweighs lost profit in other areas. This area need not encompass an entire MTA; it would however, likely encompass a substantial portion of the MTA, an area substantially larger than the average BTA.

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population within the Houston MTA, so that the Houston BTA alone might be a relevant geographic market.

[35]We assume here that any bar to price discrimination is enforced across an MTA. If firms may not discriminate across even broader regions, the relevant geographic market may be even larger than an MTA.

We conclude that the relevant geographic market for mobile telecommunications services will generally be larger than a BTA. Firms operating in a single BTA will typically find it unprofitable to raise prices in that BTA alone. Thus, in the absence of price discrimination, relevant geographic markets will encompass areas larger than a BTA, and market shares and concentration computed for areas that are not meaningful markets have no economic significance, as they do not provide a measure or gauge of market power. By imposing limits on the bandwidth that cellular companies may acquire in the forthcoming auction, the Commission must implicitly be assuming that narrow geographic markets exist. They must, therefore, also be assuming that mobile systems providers may discriminate in their pricing to subscribers in narrow geographic regions, because, in the absence of discrimination, such narrow regions cannot be relevant markets. We return to this important issue when we evaluate the reasonableness of the Commission's current limitations on the share of bandwidth that may be licensed to cellular operators.

IV. Antitrust Analysis of the Number of Firms, Market Shares, and Concentration

The number of firms, the shares they hold, and measured concentration are key features of market structure. Generally, economists believe that the larger the number of firms, and the lower their individual market shares, the more likely competition will prevail. Conversely, as the number of firms declines and their shares increase, the likelihood increases that the firms may be able, either individually or as a group, to raise prices above competitive levels. Thus, mergers and acquisitions, because they typically increase individual shares and measured

concentration, are closely scrutinized to determine whether a specific transaction poses a material threat of reducing competition and allowing prices to increase.

There is, however, no simple, hard-and-fast rule concerning whether a particular level of industry concentration short of a merger to monopoly will lead to non-competitive outcomes. The ability of a group of firms to raise prices is materially affected by many factors in addition to market structure. Because these factors influence how competition works in specific markets, concentration is only one factor, albeit an important one, in evaluating the effect of mergers and acquisitions.

The 1992 Merger Guidelines reflect current standards adopted both by the Federal Trade Commission and the Antitrust Division of the Department of Justice for evaluating mergers and acquisitions. The Guidelines use the Herfindahl-Hirschman Index (HHI) to measure market concentration. The HHI is calculated by summing the squares of the individual market shares of all market participants. For example, in a market with 10 firms, each of which had a market share of 10 percent, the HHI would be 1000.[36] A market consisting of seven firms, with two firms having shares of 25 percent each and the remaining five firms having shares of 10 percent each, has an HHI of 1750.[37] The Guidelines identify different criteria in evaluating mergers, depending on the level of concentration, as measured by the HHI, that prevails after the transaction.

> Post-Merger HHI Below 1000. Market is unconcentrated. Mergers are unlikely to have adverse competitive effects. No further analysis is required.

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[36]Each firm's share of 10% would be squared (10 x 10=100), and the resulting numbers added together. In this case, each of the 10 firms' contribution to the HHI is 100; the HHI itself, therefore, is 1,000.

[37]Each of the two firms with 25 percent contributes 625 to the HHI (25 x 25 = 625), and the remaining five firms contribute 100 each (10 x 10 = 100); the HHI totals 1750.

Post-Merger HHI Between 1000 and 1800. Market is moderately concentrated. Mergers that produce an increase in the HHI of less than 100 points are unlikely to have adverse competitive effects. No further analysis is required. Mergers that produce an increase in the HHI of more than 100 points may raise competitive concerns depending on factors set forth elsewhere in the Guidelines.

Post-Merger HHI Above 1800. Market is highly concentrated. Mergers that produce an increase in the HHI of less than 50 points are unlikely to have adverse competitive effects. No further analysis is required. Mergers that produce an increase in the HHI of more than 50 points may raise competitive concerns depending on factors set forth elsewhere in the Guidelines. Mergers that produce an increase in the HHI of more than 100 points are presumed to enhance market power or facilitate its exercise. However, this presumption may be overcome by a showing that factors enumerated elsewhere in the Guidelines make such exercise of market power unlikely.[38]

The Guidelines also state that, in some circumstances, a merger that results in a firm with a market share of 35 percent or more may confer on that firm the ability unilaterally to raise prices.[39]

As discussed in more detail later (see Section VI), the key factors in addition to concentration to which the Guidelines direct attention include conditions that facilitate or inhibit collusion or cooperation among firms, e.g., the ability to detect and punish a firm's deviation from a collusive agreement; the possibility of expansion by existing firms; and entry by new competitors. Broadly, the focus is on the ease or difficulty of collusion among existing firms, and on the ability of existing firms to expand, or new firms to enter the market, to undercut or defeat any attempt to raise prices to consumers to noncompetitive levels.[40]

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[38]Merger Guidelines, ¶ 1.51.

[39]Merger Guidelines, ¶ 2.22. The Merger Guidelines leave open the possibility that mergers that otherwise might be challenged may be allowed if the transaction is necessary to achieve otherwise unattainable efficiencies. See ¶ 4.

[40]Merger Guidelines, ¶¶ 2 and 3. Franklin M. Fisher ("Horizontal Mergers: Triage and Treatment," Journal of Economic Perspectives, 1, 23-40, Fall 1987, p. 31), observes that "while the HHI seems a reasonable way to measure concentration, neither theory nor reliable econometric evidence shows that the HHI is a sufficient statistic for determining the effects of concentration on noncompetitive behavior." Elsewhere ("Diagnosing Monopoly,"

This summary of the market structure standard enunciated by the Merger Guidelines permits several important observations. The numerical HHI standard that is applied to evaluate whether or not a transaction threatens to harm competition is not a single number, but varies depending on market circumstances. In moderately concentrated markets (HHI between 1000 and 1800), only transactions that increase the HHI by more than 100 points require further analysis, and, even if the increase is significantly greater than 100, reflecting a "large" increase in concentration, the acquisition may still not be viewed as harmful to competition. While the standard for evaluating increases in concentration becomes more stringent when the post-merger HHI is above 1800, even in such cases there is a presumption that small increases in concentration (HHI change of less than 50) will not harm competition. Moreover, transactions involving quite large increases in concentration (HHI change exceeding 100) may be permitted if certain other factors are present.

Finally, the standard for evaluating when a single firm's share raises competitive concerns is quite high — 35 percent. Thus, a merger that results in a single firm share of less than 35 percent (so long as it does not run afoul of the overall HHI standards) is not treated as anticompetitive.

The 1992 Merger Guidelines incorporate revised standards from those that had been issued in the 1980s.[41] The 1992 Guidelines relaxed certain portions of the merger standards,

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Quarterly Review of Economics and Business, 19, Summer 1979, reprinted in Industrial Organization, Economics, and the Law, John Monz (ed.), Cambridge, MA: MIT Press, 1991, p. 15), Fisher observes that "...the one proposition which most people believe is that a small share shows the absence of monopoly power and a large share its presence....This is not true. The right question is that of what happens to share...when monopoly profits are sought. The fundamental question is whether competitors are able to grow."

[41]The first Merger Guidelines were issued by the Department of Justice in 1968. Guidelines incorporating a substantially different framework and set of standards were issued in 1982. At about the same time (in 1982), the Federal Trade Commission issued its own "Statement Concerning Horizontal Merger Guidelines." The DOJ revised

particularly by reducing reliance on market shares and concentration measures alone. For example, in describing enforcement policy for mergers raising concentration by more than 100 points in moderately concentrated markets (post-merger HHI between 1000 and 1800), the 1984 Guidelines had stated that the Antitrust Division "is likely to challenge mergers in this region" unless the Department concluded on the basis of other factors that the merger was not likely substantially to lessen competition. In the 1992 Guidelines, the language concerning the likelihood of legal challenge was deleted, and the concern moderated to state that such transactions "raise significant competitive concerns" depending on other factors set forth in the Guidelines.

Similarly, when evaluating highly concentrated markets (post-merger HHI above 1800), the 1984 Guidelines stated that mergers that increased the HHI by more than 100 points were likely to be challenged because, "only in extraordinary cases will such [other] factors establish that the merger is not likely substantially to lessen competition." By 1992, the standard had been modified to reflect the belief that if a post-merger HHI exceeded 1800 and the change was greater than 100, there was a presumption that the transaction was "... likely to create or enhance market power or facilitate its exercise." Even in this case, however, the Guidelines stated that this presumption could be overcome by a showing that other factors made the exercise of market power unlikely.

The changes in language between 1984 and 1992 reflected the actual enforcement standards being applied. Few cases were brought during the 1980s that attempted to prevent or enjoin mergers in markets with post-merger HHI's below 1800, regardless of the change in the

its Guidelines in 1984. The joint 1992 Guidelines thus reflect a revision of the 1982 and 1984 documents.

HHI. In fact, an analysis of the cases actually filed by the FTC and Antitrust Division found that complaints were seldom brought in markets where the post-merger HHI was in a range of 2000 to 2100. For example, in 1989 an American Bar Association Task Force wrote:

> The question remains, however, whether the 1984 Merger Guidelines accurately present the [Antitrust] Division's enforcement policy as applied to actual cases. ... The Division has brought very few cases in which the HHI levels for the post-merger industry were between 1000 and 1800, although the 1984 Guidelines indicate that in this range the Department "is likely to challenge" a merger that increases the HHI by 100 points or more, absent countervailing factors. Similarly, it appears that a significant number of mergers with HHIs in excess of 1800 and HHI increases above 100 have not been challenged, despite the 1984 Guidelines' assertion that such mergers lack anticompetitive effects "only in extraordinary cases." The resulting public perception is that the Division may be pursuing an enforcement policy more lenient than the 1984 Guidelines dictate...[42]

Similarly, in commenting on the 1984 Guidelines, the then-Acting Assistant Attorney General for Antitrust, Charles James, stated:

> ... the concentration standards [in the 1984 Guidelines] did not reflect enforcement practice. In fact, the agencies challenged only very few mergers in moderately concentrated markets and only some of the mergers in markets that were highly concentrated.[43]

The failure of the antitrust agencies strictly to enforce the 1984 Guidelines, in which the standards were based heavily on concentration screens, reflected two practical considerations. First, in reviewing mergers for enforcement action, the agencies routinely considered, and gave substantial weight to, factors other than concentration and market shares. Thus, a wide variety of factors, several of which were subsequently incorporated into the 1992 Guidelines, played major roles in the screening process, and influenced the agencies in their exercise of discretion in case selection.

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[42]"Report of the ABA Antitrust Law Section Task Force on the Antitrust Division of the U.S. Department of Justice," Antitrust Law Journal, Vol. 58, Issue 3, p. 760 (footnotes omitted).

[43]Charles A. James, "Overview of the 1992 Horizontal Merger Guidelines," Antitrust Law Journal, Vol. 61, Issue 2, p. 449. See also Janet L. McDavid, "The 1992 Horizontal Merger Guidelines: A Practitioner's View of Key Issues in Defending a Merger," Antitrust Law Journal, Vol. 61, Issue 2, fn. 9, p. 461.

Second, in the 1980s, in ruling on merger actions brought by the antitrust authorities, the courts gave substantial weight to factors other than concentration. Indeed, a significant number of cases brought by the government were rejected, with the courts pointing to factors in addition to market shares and concentration. For example, in one important Circuit Court decision (*United States v. Baker Hughes Inc.*), the Court wrote:

> Imposing a heavy burden of production on a defendant would be particularly anomalous where, as here, it is easy to establish a prima facie case. The government, after all, can carry its initial burden of production simply by presenting market concentration statistics. To allow the government virtually to rest its case at that point, leaving the defendant to prove the core of the dispute, would grossly inflate the role of statistics in actions brought under Section 7 [of the Clayton Act]. The Herfindahl-Hirschman Index cannot guarantee litigation victories....Requiring a "clear showing" in this setting would move far toward forcing the defendant to rebut a probability with a certainty.[44]

Similarly, in *United States v. Syufy Enters.*, despite a merger to monopoly for a short period in the distribution of first-run movies in Las Vegas, the Court wrote:

> Time after time, we have recognized this basic fact of economic life: A high market share, though it may raise an inference of monopoly power, will not do so in a market with low entry barriers or other evidence of a defendant's inability to control prices or exclude competitors.[45]

As this discussion reflects, in antitrust enforcement matters involving changes in market structure, the antitrust authorities, in exercising prosecutorial discretion, and the courts, in actually enforcing the law, have both relaxed the concentration and share standards that may

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[44] *United States v. Baker Hughes Inc.*, 908 F.2d 992 (D.C. Cir. 1990). In the *Baker* case, in the market for hardrock hydraulic underground drilling rigs, the HHI increased by 1425 points, from 2872 to 4303. The Court pointed to such factors as easy entry by foreign firms and the sophistication of buyers as conditions mitigating concern based on HHI numbers.

[45] *United States v. Syufy Enters.*, 903 F.2d 659 (9th Cir. 1990). In *Syufy*, the Court cited with approval *Hunt-Wesson Foods, Inc. v. Ragu Foods, Inc.*, 627 F.2d 919, 924 (9th Cir. 1980), cert. denied, 450 U.S. 921, 101 S.Ct 1369, 67 L.Ed. 348 (1981): "Blind reliance upon market share, divorced from commercial reality, [can] give a misleading picture of a firm's actual ability to control prices or exclude competition." Similarly, in *United States v. Country Lakes Foods, Inc.*, 754 F. Supp. 669 (D. Minn. 1990), the Court rejected the Department of Justice case seeking to enjoin a merger between fluid milk producers in Minneapolis, despite the fact that the HHI rose from 2186 to 2832. The Court pointed to the ease of entry and expansion, the presence of powerful buyers, and efficiencies that would be created by the transaction.

have been applied in the past, and moved away from very heavy reliance on market share and concentration measures. Instead, they have applied what is appropriately viewed as a "rule of reason" analysis that incorporates many factors other than market share that are important to the competitive process in specific industries. Such a rule of reason approach is particularly appropriate for markets such as those for mobile telecommunications services, where the facts and circumstances vary by region.

V. Structural Analysis of the Mobile Telecommunications Market

Capacity and Market Shares

Because the available evidence suggests that firms may move with relative ease from the provision of one mobile telecommunications service to another, capacity is an appropriate measure of a firm's share.[46] Where firms may offer an array of services with existing equipment and infrastructure, current sales are not a good measure of competitive presence. Rather, the significance of each firm is better gauged by its ability rapidly to provide the various services in the event that prices and profits change to make specific activities more (or less) profitable. If a firm's capacity were simply identified by the bandwidth authorized to provide mobile telecommunications services, and a cellular operator's entire capacity was shifted to digital technology, each cellular operator's capacity share would simply be its share of industry

[46] Merger Guidelines, ¶ 1.41. More precisely, a mobile telecommunications firm's share within a market depends on its capacity and the proportion of the population it serves with the market. In the succeeding analysis [Tables 1 to 12], we simplify the analysis by assuming that firms with assigned bandwidth serve the entire market. In practice, where some firms will serve only a portion of the population within a market (e.g., some firms will serve customers in a BTA within a broader market), those firms that do not operate throughout the entire market would have a smaller share than in this analysis. As such, the concentration analysis in Tables 3 to 12 provides "worst case" computations of shares and HHIs. We return to this point at the end of this section, where we discuss how a firm's share in a market for mobile telecommunications services should be computed when the service territories for competitors are not all the same and marketwide.

bandwidth. Since each cellular operator holds 25 MHz of the total 170 MHz bandwidth available to offer mobile telecommunications services, its share would be 14.7 percent [25 MHz ÷ 170 MHz = .147].[47]

For mobile services, however, a carrier's effective capacity is not necessarily measured solely by the amount of bandwidth assigned to it. What is important is how that bandwidth, an input, can be converted into usable output, the information that it can carry. Under FCC rules, incumbent cellular providers will, for some time, have an obligation to serve customers who wish to continue to use analog equipment, or who use digital equipment that is incompatible with that of the cellular operator in whose area they are calling.[48] Because of this obligation to continue to serve customers that have purchased analog equipment, the effective capacity per unit of bandwidth will be smaller for existing cellular operators than for those new PCS carriers not similarly encumbered. Although there is some uncertainty about the precise magnitude, studies estimate that the capacity of a given amount of bandwidth is increased substantially if digital rather than analog technology is used to provide a service.[49] This means that the share of industry capacity available to incumbent cellular operators will be smaller than their bandwidth share. The greater the percentage of bandwidth that must be reserved for lower-capacity cellular operations, i.e., the smaller the percentage converted to digital, the smaller is the market share

[47]The 170 MHz of bandwidth is the 120 MHz that will be auctioned for PCS, and the 50 MHz employed by existing cellular carriers. Additional capacity (e.g., from SMR licensees) will be available to offer mobile services. We address the significance of this additional capacity below.

[48]Second Report and Order, ¶ 111.

[49]D.P. Reed ("Putting It All Together: The Cost Structure of Personal Communications Services," Federal Communications Commission, Office of Plans and Policy, November 1992, pp. 66-69) provides references for many of these estimates.

of the cellular carrier. Incumbent cellular operators will face an analog "handicap" so long as they must continue to provide analog cellular services.

Table 1 presents the share of industry capacity of a cellular operator that holds a license for the use of 25 MHz of spectrum after the FCC auctions the rights to use an additional 120 MHz of bandwidth, increasing the total bandwidth available for mobile telecommunications services to at least 170 MHz. Capacity estimates are derived under various assumptions about (a) the percentage of the existing cellular assignment that has been converted to digital, and (b) the increase in capacity resulting from a shift from analog to digital systems.[50] For example, assume that each of the two incumbent cellular operators must hold 10 MHz of their existing assignment of 25 MHz to serve customers with analog equipment, and that digital technology increases capacity by a multiple of 6 over analog. Under these circumstances, a cellular operator could turn 15 MHz of bandwidth to digital services, and it would continue to operate 10 MHz with analog technology. While the operator would have a 14.7 percent bandwidth share, it would have a share of only 10.9 percent of industry capacity to provide mobile services.

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[50]This increase will depend in part on the digital technology employed. Estimates of the increase in capacity from the introduction of digital technology, for which calculations are presented in the table, range from a multiple of 2 to 18, depending on such factors as the radio access method, Time Division Multiple Access (TDMA), Frequency Division Multiple Access (FDMA), or Code Division Multiple Access (CDMA), that is adopted. The base case analyzed by Read, which assumes a kind of generic digital service, employs an estimate of "almost a three-fold increase in capacity relative to the current cellular standard," which is consistent with the lower end of this range. The upper end of this range reflects the application of conversion factors of 10:1 and 18:1 and assumed adoption of Code Division Multiple Access (CDMA). See "US WEST NewVector and QUALCOMM announce plans to form CDMA subscriber equipment relationship," Business Wire, May 11, 1993. A large increase in capacity will result even if Time Division Multiple Access (TDMA) is employed. On TDMA see "Ericsson takes the lead in TDMA digital cellular system installations," Business Wire, September 30, 1993.

Table 1

Share of Industry Capacity of a Cellular Operator with a 25 MHz Assignment

MHz Analog	MHz Digital	Digital/Analog Efficiency Factor					
		2	3	4	6	10	18
20	5	0.100	0.081	0.071	0.061	0.052	0.046
15	10	0.113	0.100	0.093	0.086	0.080	0.076
10	15	0.125	0.117	0.113	0.109	0.105	0.103
5	20	0.136	0.133	0.131	0.129	0.127	0.126

Source: Charles River Associates.

Table 2 presents similar computations for a cellular operator that adds 10 MHz of bandwidth to its existing holding of 25 MHz in the forthcoming PCS auction. In this table, the capacity share represented by the added 10 MHz is simply added to the share of capacity in Table 1. Comparison of cells in the two tables shows the increase in the capacity share from the added 10 MHz that occurs under the various sets of assumptions. For example, if 40 percent (10 MHz) of the original 25 MHz must be retained for analog services, and the efficiency advantage of digital over analog is a factor of 6, adding 10 MHz of digital capacity to the cellular operator increases its share from 10.9 percent to 17.4 percent. Had the cellular carrier been able to turn all of its 35 MHz of bandwidth to digital applications, its effective share would have increased to 20.6 percent.

Table 2

Share of Industry Capacity of a Cellular Operator with a 35 MHz Assignment

MHz Analog	MHz Digital	Digital/Analog Efficiency Factor					
		2	3	4	6	10	18
20	15	0.167	0.151	0.143	0.134	0.127	0.122
15	20	0.177	0.167	0.161	0.155	0.150	0.147
10	25	0.188	0.181	0.177	0.174	0.171	0.169
5	30	0.197	0.194	0.192	0.191	0.189	0.189

Source: Charles River Associates.

We expect that cellular operators will, over time, convert their analog systems, shifting gradually to an all- or primarily-digital system. But this transition will take some time, during which the analog "handicap" will limit the market shares that should be assigned to these carriers. As this transition occurs, the capacity of the cellular carriers will increase. For example, as described above, if a cellular operator must reserve 10 MHz of capacity for analog and the conversion from analog to digital increases the capacity of the converted bandwidth six-fold, the operator's share would be 10.9 percent, based on the current allocation to PCS/cellular of 170 MHz. As the cellular operator gradually converts more capacity to digital, its share will rise to a maximum of 14.7 percent. If, however, new capacity becomes available for mobile services during this period — through the use of SMR, for example — the cellular operator's share will not reach that level. For example, if an additional 10 MHz becomes available from

SMR carriers, a firm with 25 MHz of digital capacity will have a share of 13.9 percent, rather than 14.7 percent.[51]

Other new entrants into the provision of mobile telecommunications services may further serve to reduce concentration in the markets in which cellular operators compete.[52] The Commission can be less concerned about increases in the capacity held by cellular operators as they shift to digital technology if, at the same time, the capacity share held by these operators is reduced by new entry. Indeed, even if, in the initial PCS auctions, limits are placed on the amount of spectrum in the 2 GHz band that can be licensed to cellular operators, it may be appropriate to relax these limits as new carriers enter to serve the mobile services market in the future.

Mobile Telecommunications Services Market Concentration

In the analyses above, we concluded that there is a market for all mobile telecommunications services, and that market shares associated with providing these services should be measured by the capacity of operators to deliver information through their assigned bandwidth. On the basis of market shares derived in this manner, we may evaluate concentration and the changes in concentration implied by the transfer of licenses covering specific amounts of bandwidth and capacity.[53]

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[51]While this may appear to be a relatively small decrease in share, the addition of 10 MHz of capacity would have a substantial effect on market concentration, as measured by the HHI. We discuss this issue below.

[52]See S. Sugawara ("Battle in the Skies," Washington Post, "Washington Business," October 18, 1993, pp. 1, 14-15) for descriptions of a number of satellite-based wireless systems that are planned for deployment beginning in 1994.

[53]In the text, we present calculations assuming that 10 MHz is reserved for analog applications, and that digital technology will have 6 times the effective capacity of analog. Our general conclusions are not affected by the specific number selected for either assumption, although their application to specific cases will be.